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BEYER WEAVER & THOMAS LLP
P.O. BOX 70250
OAKLAND, CA 94612-0250

EXAMINER	
QUASH, ANTHONY G	

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 06/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

GL

Office Action Summary	Application No.	Applicant(s)	
	10/796,577	TESTONI, ANNE L.	
	Examiner	**Art Unit**	
	Anthony Quash	2881	

-- Th MAILING DATE of this communication app ars on th cover sh t with th correspond nc addr ss --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32 and 35-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32 and 35-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/8/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

Applicant's amendment filed 2/21/06, have overcome the 112 rejections and the objections to the drawings listed in the prior office action, dated 11/23/05.

Claims 33-34 have been canceled by applicant's amendment, dated 2/21/06.

Response to Arguments

Applicant's arguments with respect to claims 1-32 and 35-53 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 15,17,19,26-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Sato [5,457,725].

As per claim 15, Sato [5,457,725] discloses a method comprising directing a beam towards the surface of the semiconductor wafer to emit x-rays, detecting the emitted x-rays with a detector at a first angle, collecting x-ray data from the detector, directing a beam toward the surface of the wafer to emit x-rays, detecting the emitted x-rays with the detector at a second angle, collecting x-ray data, using the x-ray data to spatially resolve the location of the defect, wherein the second angle of the detector with respect to the wafer is achieved by performing an operation selected from a group consisting of (i) moving the position of the detector to the second angle after collecting the x-ray data from the detector at the first angle and (ii) tilting the wafer to achieve the second angle after collecting the x-ray data from the first angle. See Sato [5,457,725] abstract, figs. 1-2, col. 1 lines 5-10, 28-35,45-50,60-67, col. 2 lines 1-30, 40-67, col. 3 lines 1-5,10-40, col. 4 lines 5-55.

As per claim 17, Sato [5,457,725] discloses detecting emitted x-rays at a plurality of angles with respect to the wafer surface. See Sato [5,457,725] abstract, figs. 1-2, col. 1 lines 5-10, 28-35,45-50,60-67, col. 2 lines 1-30, 40-67, col. 3 lines 1-5,10-40, col. 4 lines 5-55.

As per claim 19, Sato [5,457,725] discloses the second angle of the detector with respect to the wafer being achieved by tilting the wafer after collecting the x-ray data from the first angle. See Sato [5,457,725] abstract, figs. 1-2, col. 1 lines 5-10, 28-35,45-50,60-67, col. 2 lines 1-30, 40-67, col. 3 lines 1-5,10-40, col. 4 lines 5-55.

As per claim 26, Sato [5,457,725] discloses the directed beam being an electron beam. See Sato [5,457,725] col. 1 lines 45-50, col. 3 lines 35-40.

As per claim 27, Sato [5,457,725] discloses the directed beam being a focused ion beam. See Sato [5,457,725] col. 1 lines 45-50.

Claims 1-6,8-9,11-14,54 are rejected under 35 U.S.C. 102(e) as being anticipated by Yun [2003/0223536].

As per claim 1, Yun [2003/0223536] discloses a directing a beam toward the surface of the wafer to emit x-rays, detecting the x-rays with a plurality of detectors at a plurality of angles, collecting the x-ray data from the detectors, and using the x-ray data to spatially resolve the location of the defects. See Yun [2003/0223536] abstract, fig. 9, paragraphs [0001,0003-0006,0008-0011,0015,0017-0021,0034,0039,0044-0045,0048-0050,0070-0076,0081-0082,0084,0087,0089-0093,0096-0097].

As per claim 2, Yun [2003/0223536] discloses the detectors detecting the x-rays simultaneously. See Yun [2003/0223536] fig. 9, paragraphs [0034,0073].

As per claims 3,54, Yun [2003/0223536] discloses the using x-ray data to spatially resolve the location of the defect is accomplished by generating three-dimensional image based on the x-ray data. See Yun [2003/0223536] paragraphs [0075,0084,0090-0091].

As per claim 4, Yun [2003/0223536] discloses combining the x-ray data from at least two x-ray emission energy spectra. See Yun [2003/0223536] abstract, fig. 9,

paragraphs [0001,0003-0006,0008-0011,0015,0017-0021,0034,0039,0044-0045,0048-0050,0070-0076,0081-0082,0084,0087,0089-0093,0096-0097].

As per claim 5, Yun [2003/0223536] discloses the defect residing fully within a sample volume. See Yun [2003/0223536] abstract, fig. 1.

As per claim 6, Yun [2003/0223536] discloses the beam being stepped over an area where the defect resides. See Yun [2003/0223536] paragraph [0091].

As per claim 8, Yun [2003/0223536] discloses beam being rastered over an area where the defect resides. See Yun [2003/0223536] paragraph [0003-0004].

As per claim 9, Yun [2003/0223536] discloses the beam being an electron beam. See Yun [2003/0223536] paragraph [0045].

As per claim 11, Yun [2003/0223536] discloses the elemental composition of the defect being determined from the x-ray data. See Yun [2003/0223536] paragraphs [0090-0091].

As per claim 12, Yun [2003/0223536] discloses the wafer comprises copper surrounded by dielectric material. See Yun [2003/0223536] paragraphs [0087,0096].

As per claim 13, Yun [2003/0223536] discloses the detected x-rays being at least copper Kα and copper Lα x-ray. See Yun [2003/0223536] paragraphs [0076,0081-0082,0089].

As per claim 14, Yun [2003/0223536] discloses the detected x-rays are at least copper Kα, copper Lα, and silicon Kα x-rays. See Yun [2003/0223536] paragraphs [0076,0081-0082,0087,0089].

Claims 47,49-52 are rejected under 35 U.S.C. 102(e) as being anticipated by Yun [2003/0223536].

As per claim 47, Yun [2003/0223536] discloses a beam generator operable to direct a charged particle beam toward a structure, a plurality of detectors positioned at different angles with respect to the surface of the semiconductor wafer to detect x-rays from the structure in response to the charged particle beam, and a processor (computer) to cause the beam generator to direct a beam towards the structure, and characterize one or more defects based on the detected x-rays from a plurality of detectors so as to spatially resolve the one or more defects in three dimensions. See Yun [2003/0223536] abstract, fig. 9, paragraphs [0001,0003-0006,0008-0011,0015,0017-0021,0034,0039,0044-0045,0048-0050,0070-0076,0081-0082,0084,0087,0089-0093,0096-0097].

As per claim 49, Yun [2003/0223536] discloses the scanned structure portion of a interconnect structure in an integrated circuit device. See Yun [2003/0223536] paragraph [0081,0088,0096].

As per claim 50, Yun [2003/0223536] discloses the beam being an electron beam. See Yun [2003/0223536] paragraph [0045].

As per claim 51, Yun [2003/0223536] discloses the beam being stepped over an area of the sample surface. See Yun [2003/0223536] paragraph [0091].

As per claim 52, Yun [2003/0223536] discloses beam being rastered over an area of the sample surface. See Yun [2003/0223536] paragraph [0003-0004].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ladell [3,046,399].

With respect to independent claims 1-2, Ladell [3,046,399] discloses a method of inspecting a wafer, comprising directing a beam toward the surface of the wafer to emit x-rays, detecting the emitted x-rays with a plurality of detectors positioned at a plurality of angles, collecting the data from the detectors and using the data to spatial resolve the constituents in the wafer, and detect the emitted x-rays simultaneously. See Ladell [3,046,399] figs. 1-2, col. 1 lines 5-65, col. 2 lines 110, 20-25, 65-70. However, Ladell [3,046,399] does not explicitly state resolving the location of a defect. Ladell [3,046,399] does however state the plurality of detectors being arranged to detect the constituents of the material. See Ladell [3,046,399] col. 1 lines 55-65. Therefore it is the examiner's view that Ladell [3,046,399] does teach the equivalent of locating the defect, since it detects the constituents. By detecting the constituents that make up a material, one is in essence detecting the any defects in the material. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was

made to detect the defects in a material in order to determine the purity of the material or aid in determining factors that might lead to material breakage.

Claims 7,10,53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yun [2003/0223536] in view of Cairns [4,110,625].

As per claim 7, Yun [2003/0223536] teaches all aspects of the claim except for explicitly stating that the beam is stepped in a grid configuration. It is well known in the art to have beam stepped in a grid formation. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the beam stepped in a grid formation order to increase that rate at which wafers could be examined for defects.

As per claims 10,53, Yun [2003/0223536] teaches all aspects of the claim except for explicitly stating the directing an ion beam at the sample to cause it to emit x-rays. It was notoriously well known in the art at the time the invention was made to have ions directed at a target in order to stimulate emission of x-rays from wafers. Cairns [4,110,625] is presented here as to show that it was know. See Cairns [4,110,625] fig. 7 and col. 8 lines 5-10.

Claims 1-2,5,11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parobek [4,959,848].

As per claim 1, Parobek [4,959,848] teaches a directing a beam toward a wafer (42, sample), detecting the emitted x-rays with a plurality of detectors (64,88) position at

a plurality of angles with respect to the wafer surface, collecting x-ray data, and using the data to determine the concentrations of selected elements in the sample. See Parobek [4,959,848] abstract, fig. 1, column 1, col. 2 lines 1-10,25—35, col. 3 lines 15-18,34-36,55-68, col. 4 line 15-35, 55-68, col. 5 lines 5-21, 45-50. Although Parobek [4,959,848] does not explicitly state determining the location of the defect, it is the examiners view by determining the concentrations of selected material within the sample at various locations, Parobek [4,959,848] is inherently determining the location of defects, or that which could be interpreted as defects such as impurities in the sample. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine the location of defect in a sample in order to aid one in sorting out which wafer were to be separated from the production line and which wafers are to be sent to customers.

As per claim 2, Parobek [4,959,848] teaches detecting the x-rays simultaneously. See Parobek [4,959,848] col. 2 lines 1-15, fig. 1.

As per claim 5, Parobek [4,959,848] teaches determining the concentration (defect) that resides fully within a sample volume. See Parobek [4,959,848] abstract.

As per claim 11, Parobek [4,959,848] teaches the elemental composition being determined from x-ray data. See Parobek [4,959,848] abstract, fig. 1, column 1, col. 2 lines 1-10,25—35, col. 3 lines 15-18,34-36,55-68, col. 4 line 15-35, 55-68, col. 5 lines 5-21, 45-50.

Claims 15-22,28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parobek [4,959,848] in view of Jenkins [4,472,825].

With respect to claims 15,20-21 Parobek [4,959,848] teaches directing a beam towards the surface of the wafer to thereby emit x-rays, detecting x-rays at a first angle with the detector and collecting x-ray data from the detector, and comparing the data in order to observe the differences. See Parobek [4,959,848] abstract, fig. 1, column 1, col. 2 lines 1-10,25—35, col. 3 lines 15-18,34-36,55-68, col. 4 line 15-35, 55-68, col. 5 lines 5-21, 45-50. However, Parobek [4,959,848] does not explicitly state moving the detector to a second angle and detecting x-rays with the same detector at a second angle. Jenkins [4,472,825] does teach moving the detector to a second angle and detecting x-rays with the same detector at a second angle. In addition, Jenkins [4,472,825] teaches wherein the second angle of the detector with respect to the wafer surface is achieved by performing an operation selected from a group consisting of moving the position of the detector to a second angle after collecting the x-ray data from the detector at the first angle and tilting the wafer to achieve the second angle after collecting the x-ray data from the first angle. See Jenkins [4,472,825] abstract, fig. 2, col. 1 lines 1-15,25-65, and col. 2 lines 1-25. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to move the detector to a second angle and detecting x-rays with the same detector at a second angle in order to obtain detect difference characteristic x-rays that would are emitted at a different angle in order to obtain a better image of the area being irradiated. Although neither Parobek [4,959,848] nor Jenkins [4,472,825] explicitly state determining the

location of the defect, it is the examiners view by determining the concentrations of selected material within the sample at various locations, Parobek [4,959,848] is inherently determining the location of defects, or that which could be interpreted as defects such as impurities in the sample. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine the location of defect in a sample in order to aid one in sorting out which wafer were to be separated from the production line and which wafers are to be sent to customers.

As per claim 16, Jenkins [4,472,825] teaches the detector detecting the emitted x-rays at the first and second angles at different sampling times. See Jenkins [4,472,825] abstract, fig. 2, col. 1 lines 1-15,25-65, and col. 2 lines 1-25.

As per claim 17, Jenkins [4,472,825] teaches the detector detects emitted x-rays at a plurality of angles with respect to the wafer surface. See Jenkins [4,472,825] abstract, fig. 2, col. 1 lines 1-15,25-65, and col. 2 lines 1-25.

As per claim 18, Jenkins [4,472,825] teaches the second angle of the detector with respect to the wafer surface being achieved by moving the position of the detector after collecting the x-ray data from the first angle. See Jenkins [4,472,825] abstract, fig. 2, col. 1 lines 1-15,25-65, and col. 2 lines 1-25.

As per claim 19, Jenkins [4,472,825] teaches the second angle of the detector with respect to the wafer surface is achieved by tilting the wafer after collecting the x-ray data from the first angle. See Jenkins [4,472,825] abstract, fig. 2, col. 1 lines 1-15,25-65, and col. 2 lines 1-25.

As per claim 22, Parobek [4,959,848] teaches determining the concentration (defect) that resides fully within a sample volume. See Parobek [4,959,848] abstract.

As per claim 28, Parobek [4,959,848] teaches the elemental composition being determined from x-ray data. See Parobek [4,959,848] abstract, fig. 1, column 1, col. 2 lines 1-10,25—35, col. 3 lines 15-18,34-36,55-68, col. 4 line 15-35, 55-68, col. 5 lines 5-21, 45-50.

Claims 32,35,41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koenig [3,663,812].

As per claims 32, Koenig [3,663,812] teaches a method comprising directing a beam toward the surface of a wafer to emit x-rays, detecting the emitted x-rays substantially, simultaneously at a plurality of angles with respect to the wafer with a single detector (28), collecting the data from the detector. See Koenig [3,663,812] abstract, figs. 1,7, col. 4 lines 42-58, col. 5 lines 15-60, col. 9 lines 25-45, 65-75, col. 10 lines 7. Although Koenig [3,663,812] does not explicitly state determining the location of the defect, it is the examiners view by determining the concentrations of selected material within the sample at various locations; Koenig [3,663,812] inherently determines the location of defects, or that, which could be interpreted as defects such as impurities in the sample. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to determine the location of defect in a sample in order to aid one in sorting out which wafer were to be separated from the production line and which wafers are to be sent to customers.

As per claim 35, Koenig [3,663,812] teaches all aspects of the claim except for explicitly stating that the generating an image of the defect location based on the x-ray data. Koenig [3,663,812] does however, teach an output storage and/or display unit. See Koenig [3,663,812] fig. 7. Therefore it is the examiner's view that Koenig [3,663,812] does indeed imply this since, it also teaches determining the composition of the material as the beam scans across the sample and that the signals from this aspect being sent to the display unit. See Koenig [3,663,812] abstract, fig. 7, col. 9 line 65-col.10 line 6.

As per claim 41, Koenig [3,663,812] teaches the direct beam being an electron beam. See Koenig [3,663,812] col. 4 lines 42-50.

As per claim 42, Koenig [3,663,812] teaches that the directed beam can be any other source capable of exciting a sample to cause it to emit characteristic x-rays. See Koenig [3,663,812] col. 4 lines 43-50. This the examiner interprets to include focused ion beams.

As per claim 43, Koenig [3,663,812] teaches determining the composition of the material from x-ray data. This the examiner interprets as including the determination of defects in the material. See Koenig [3,663,812] abstract, figs. 1,7, col. 4 lines 42-58, col. 5 lines 15-60, col. 9 lines 25-45, 65-75, col. 10 lines 7.

Claims 23-25,29-31,48,55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato [5,457,725] in view of Yun [2003/0223536].

As per claim 23,25, Sato [5,457,725] teaches all aspects of the claim except for explicitly stating that the beam step over an area where the defect resides and the beam being rastered over an area where the defect resides. Yun [2003/0223536] does teach the beam being stepped over an area where the defect resides and being rastered over an area where the defect resides. See Yun [2003/0223536] paragraph [0003-0004,0091]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the beam be stepped over an area where the defect resides and being rastered over an area where the defect resides, in order to increase the rate at which defects are located and also increase the rate at which wafers are processed.

As per claim 24, Sato [5,457,725] in view of Yun [2003/0223536] teach all aspects of the claim except for explicitly stating that the beam is stepped in a grid configuration. It is well known in the art to have beam stepped in a grid formation. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the beam stepped in a grid formation order to increase that rate at which wafers could be examined for defects.

As per claim 29, Yun [2003/0223536] discloses the wafer comprises copper surrounded by dielectric material. See Yun [2003/0223536] paragraphs [0087,0096].

As per claim 30, Yun [2003/0223536] discloses the detected x-rays being at least copper $K\alpha$ and copper $L\alpha$ x-ray. See Yun [2003/0223536] paragraphs [0076,0081-0082,0089].

As per claim 31, Yun [2003/0223536] discloses the detected x-rays are at least copper Kα, copper Lα, and silicon Kα x-rays. See Yun [2003/0223536] paragraphs [0076,0081-0082,0087,0089].

As per claim 48, Sato [5,457,725] teaches the characterizing operation being based on a ratio of a first x-ray intensity for a first material over a second x-ray intensity for a second material, wherein the first and second x-ray intensities are obtained from the detected x-rays from the scanned structure. See Sato [5,457,725] abstract, figs. 1-2, col. 1 lines 5-10, 28-35,45-50,60-67, col. 2 lines 1-30, 40-67, col. 3 lines 1-5,10-40, col. 4 lines 5-55.

As per claim 55, Yun [2003/0223536] teaches the defect being spatially located in three dimensions. See Yun [2003/0223536] paragraphs [0075,0084,0090-0091].

Claims 36-40,44-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koenig [3,663,812] in view of Yun [2003/0223536].

As per claim 36, Koenig [3,663,812] teaches all aspects of the claim except for explicitly stating that the image being generated by combining the x-ray data from at least two x-ray emission energy spectra. Yun [2003/0223536] does teach combining the x-ray data from at least two x-ray emission energy spectra. See Yun [2003/0223536] abstract, fig. 9, paragraphs [0001,0003-0006,0008-0011,0015,0017-0021,0034,0039,0044-0045,0048-0050,0070-0076,0081-0082,0084,0087,0089-0093,0096-0097]. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the image be generated by combining the x-ray data from at least two x-ray emission energy spectra in order to

obtain a better image of the defect and composition of the wafer since it was known that x-rays emitted from the wafer at different angles and energies indicated different types of constituents located in the wafer. Therefore by combining the two x-ray spectra one is able to located and determine the composition of different materials within the wafer.

As per claim 37, Yun [2003/0223536] teaches the defect residing fully within a sample volume. See Yun [2003/0223536] abstract, fig. 1.

As per claim 38, Yun [2003/0223536] teaches the beam being stepped over an area where the defect resides. See Yun [2003/0223536] paragraph [0091].

As per claim 39, Koenig [3,663,812] in view of Yun [2003/0223536] teach all aspects of the claim except for explicitly stating that the beam is stepped in a grid configuration. It is well known in the art to have beam stepped in a grid formation. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to have the beam stepped in a grid formation order to increase that rate at which wafers could be examined for defects.

As per claim 40, Yun [2003/0223536] teaches beam being rastered over an area where the defect resides. See Yun [2003/0223536] paragraph [0003-0004].

As per claim 44, Yun [2003/0223536] teaches the wafer comprises copper surrounded by dielectric material. See Yun [2003/0223536] paragraphs [0087,0096].

As per claim 45, Yun [2003/0223536] teaches the detected x-rays being at least copper Kα and copper Lα x-ray. See Yun [2003/0223536] paragraphs [0076,0081-0082,0089].

As per claim 46, Yun [2003/0223536] teaches the detected x-rays are at least copper Kα, copper Lα, and silicon Kα x-rays. See Yun [2003/0223536] paragraphs [0076,0081-0082,0087,0089].

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Patent Nos. 3,213,278 to N. Spielberg, 5,187,727 to Vogler et al, 3,030,507 to F. Khol, and 6,448,556 to Cowley et al., are consider pertinent to applicants disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Quash whose telephone number is (571)-272-2480. The examiner can normally be reached on Monday thru Friday 9 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on (571)-272-2477. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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A. Quash
AQ
5/26/06

Nikita Wells
NIKITA WELLS
PRIMARY EXAMINER
05/30/06